Avaya Solution & Interoperability Test Lab

Application Notes for Extreme Networks Aspen 8810 with Avaya C364T-PWR Converged Stackable Switch, Avaya S8500 Media Server and Avaya G650 Media Gateway - Issue 1.0

Abstract

These Application Notes present a sample quality of service configuration for the Avaya S8500 Media Server with an Avaya G650 Media Gateway using Extreme Networks Aspen 8810 and Avaya C364T-PWR Converged Stackable Switch. The objective of the test was to evaluate interoperability of the products in an Enterprise Local Area Network. All test cases completed successfully. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

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1. Introduction

The network diagram in **Figure 1** shows two offices. The office labeled "Main Office" uses an Avaya S8500 Media Server with an Avaya G650 Media Gateway. The office labeled "Branch Office" uses Avaya IP telephones.

The Extreme Networks Aspen 8810 is used in the main office, and the Avaya C364T-PWR Converged Stackable Switch is used in the branch office. The Aspen and the Avaya C364T-PWR are connected through a 1000 Base-X (Fiber) or 100 Base-T link. The G48P PoE module on the Extreme Networks Aspen and the Avaya C364T-PWR Converged Stackable Switch are used to provide inline power to the Avaya IP telephones.

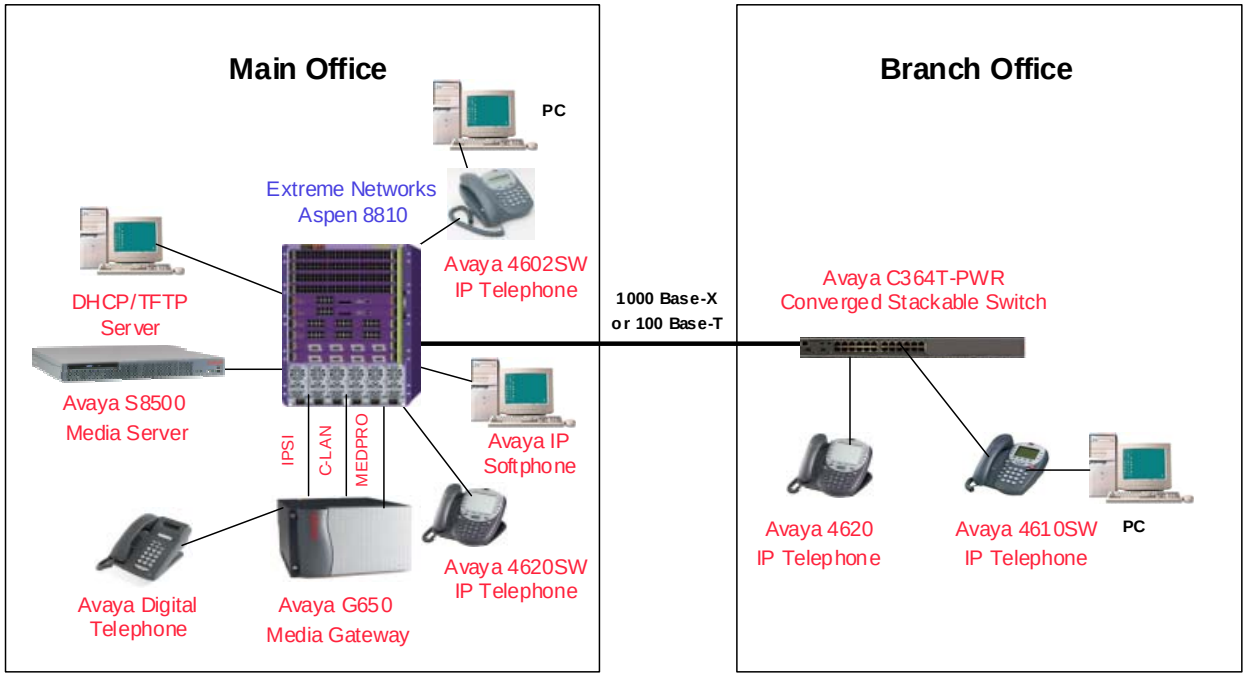

Figure 1: Network Configuration

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2. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment	Version
Avaya C364T-PWR Converged Stackable Switch	4.3.12
Avaya S8500 Media Server Avaya Communication Manager	 2.1.1 (load 414.1)
Avaya G650 Media Gateway IPSI C-LAN MEDPRO	 FW012 FW012 FW095
Avaya 4602SW IP Telephone	1.8.3
Avaya 4610SW IP Telephone	2.1.3
Avaya 4620 IP Telephone	2.1.3
Avaya 4620SW IP Telephone	2.1.3
Avaya IP Softphone	5.1.4.6
Avaya 6402D Digital Telephone	
Extreme Aspen Switch 8810 G48P (48-port 10/100/1000 Base-T with PoE) G48T (48-port 10/100/1000 Base-T) G24X (24-port 1000 Base-X)	11.1.1.9

Table 1 - Network Component Software Versions

3. Configuration Overview

3.1. Port Configuration Overview

In the main office, ports 3:1 to 3:4 on the Extreme Networks Aspen are used to connect to the Avaya S8500 Media Server and the Avaya G650 Media Gateway (IPSI, C-LAN and MEDPRO). It is recommended to configure the Avaya S8500 Media Server and the Avaya G650 Media Gateway IPSI on one VLAN and the Avaya G650 Media Gateway C-LAN and MEDPRO on another VLAN. In each of the offices, a set of ports is used to connect end-user devices. For example, the ports used for end-user devices may connect to a computer, an IP telephone, or an IP telephone with an attached computer. This is accomplished by configuring two VLANs on the end-user ports. The tagged VLAN is used for IP telephones, and the untagged VLAN is for computers, whether standalone, or attached to an IP telephone.

3.2. QoS Configuration Overview

3.2.1. Overview of Avaya QoS Features

The Avaya VoIP components support 802.1p/Q priority and DiffServ. When 802.1Q is enabled on the Avaya S8500 Media Server and the IPSI board of the Avaya G650 Gateway, VLAN 0 will be used for all outgoing packets. The Extreme Networks Aspen will treat the packets tagged

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with VLAN 0 as clear traffic. Therefore, it is recommended to enable DiffServ examination on these ports.

The Avaya C364T-PWR Converged Stackable Switch supports 802.1p/Q priority for Layer 2 traffic, and can be configured to trust 802.1p/Q priority (CoS) or DSCP or both for Layer 3 traffic.

3.2.2. Overview of Extreme Networks QoS Features

QoS profiles define how the Extreme Networks switch will respond to various categories of traffic. The parameters defined in the QoS profile include minimum and maximum percentage bandwidth, priority settings, and other parameters. By default, eight QoS profiles (numbered QP1-QP8) are assigned priorities that map to eight hardware queues on every physical port. By default, a higher quality profile number implies a higher transmit priority. For Ethernet interfaces, traffic can be classified to use a particular QoS profile based on a variety of parameters, including IP-based information, MAC information, 802.1p, DiffServ, physical source port, etc. By default, 802.1p is used to classify ingress traffic. Also by default, 802.1p values 0-6 are classified to QP1 and 802.1p value 7 is classified to QP8. If DiffServ examination is enabled, DiffServ will override 802.1p for classification of traffic from a port. By default, DiffServ values 0-55 are classified to QP1. DiffServ values 56-63 are classified to QP8. See Appendix A and B for default 802.1p and DiffServ to QP mapping.

On egress, the Extreme Networks switch can preserve or replace 802.1p priority values and DiffServ values. If 802.1p replacement is enabled, the transmitted 802.1p priority is determined by the hardware queue used to transmit the packet. Thus, on a tagged link, 802.1p replacement provides a convenient way to request the same priority treatment from the next switch, independent of the classification method used in the transmitting switch. The switch can also be configured to re-mark the DiffServ value prior to transmission. The re-marked DiffServ value is also determined by the hardware queue. DiffServ replacement provides a convenient way to request the same priority treatment from a next hop that observes DiffServ value, independent of the classification scheme used by the transmitting switch. See Appendix C for default QP to DiffServ mapping. The default strict priority queuing is used in these Application Notes.

None of the foregoing QoS operations impact switch performance.

3.2.3. QoS Configuration Employed

In order to simplify QoS configuration, all the ports on the Extreme Networks Aspen are configured to enable DiffServ Examination. In order to preserve 802.1p/Q priority from the Extreme Networks Aspen to the Avaya C364T-PWR Converged Stackable Switch, the inter-office link is configured to support tagged VLANs. All the ports are enabled with 802.1p/Q and DiffServ replacement on the Extreme Networks Aspen.

All the Avaya VoIP components including the Avaya S8500 Media Server, the IP cards in the Avaya G650 Media Gateway, Avaya IP telephones and Softphones are configured with DiffServ value 56. In order to support an IP telephone and attached PC in different VLANs, 802.1Q must be enabled on the IP telephone. The Avaya IP telephones are configured with 802.1p/Q priority

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7. Since Extreme Networks switches treat VLAN 0 as clear traffic (untagged VLAN), it does not matter if 802.1Q is enabled on the Avaya S8500 Media Server and the IPSI of the Avaya G650 Media Gateway.

The Avaya C364T-PWR Converged Stackable Switch trusts 802.1p/Q priority for Layer 2 traffic, and is configured to trust CoS-DSCP for Layer 3 traffic. By configuring to trust CoS-DSCP, the Avaya C364T-PWR will use a higher CoS value mapped from 802.p/Q priority and DSCP. The Avaya C364T-PWR will preserve 802.1p/Q priority from the Avaya IP telephones to the Extreme Networks Aspen.

Table 2 summarizes the QoS configuration used for the Avaya equipment, and the directly connected Extreme Networks Aspen. The detailed commands to implement this configuration on each product are provided in the forthcoming sections.

Avaya Equipment	802.1p/Q and DiffServ Configuration	Aspen Port Configuration
IP telephones	IP phone tags with VLAN ID received from the DHCP server. 802.1p/Q priority and DiffServ value are received from the IP network region configured in Avaya Communication Manager. (IP telephones are mapped to an IP network region based on source IP addresses)	Tagged VLAN on the port for the IP telephone. Untagged VLAN for the PC attached to the phone.
PC running IP Softphone	DiffServ value is received from the IP network region configured in Avaya Communication Manager. (IP Softphones are mapped to an IP network region based on source IP addresses).	Untagged VLAN to support any NIC.
IPSI on Avaya G650 Media Gateway	Using IPSI administration from IPSI services port to set DiffServ value to 56.	Untagged VLAN
C-LAN and MEDPRO on Avaya G650 Media Gateway	DiffServ value is received from the IP network region configured in Avaya Communication Manager.	Untagged VLAN
Avaya S8500 Media Server	Use **change ip-services interface** to set DiffServ value to 56.	Untagged VLAN

Table 2 – QoS and Port Configuration Summary

3.3. DHCP and BOOTP Relay Configuration

Table 3 summarizes the Dynamic Host Configuration Protocol (DHCP) configuration. The DHCP and TFTP servers are configured on the same PC with IP address 192.168.89.5 (VLAN 89).

In the sample configuration, when an Avaya IP telephone is initially reset, it will send an untagged DHCP request. The Extreme Networks Aspen and the Avaya Converged Stackable

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Switch are configured with both untagged (or native) VLAN 89 and tagged (or static) VLAN 88 for the port connected to the IP telephone. Since the DHCP server is on the untagged VLAN, the untagged DHCP request will reach the DHCP server directly. The DHCP server associates this request with the 192.168.89.0 scope and returns a reply with Option 176 string, instructing the IP telephone to enable 802.1Q tagging with VLAN ID 88. The IP telephone receiving this reply will release the supplied IP address and issue a new DHCP request with VLAN ID 88. This request will be associated with the tagged VLAN on the port. The router interface of this VLAN on the Extreme Networks Aspen has IP address 192.168.88.1 and will relay the DHCP request to the DHCP server with this address as the source. The DHCP server associates this address with scope 192.168.88.0 and replies with an IP address from that scope as well as several parameters in the Option 176 string. **MCIPADD=192.168.88.22** in Option 176 configures the C-LAN IP address of the Avaya G650 Media Gateway. The IP telephone will register to this IP address. **TFTPSRVR=192.168.89.5** in Option 176 configures the TFTP server, and the IP telephone will use the TFTP server for firmware upgrade.

The Avaya IP telephone will remember its VLAN ID unless explicitly reset to defaults.

DHCP Scope	Option 3 Router	Option 176 String	Notes
192.168.88.0	192.168.88.1	MCIPADD=192.168.88.22, TFTPSRVR=192.168.89.5	192.168.88.22-C-LAN IP
192.168.89.0	192.168.89.1	L2Q=1,L2QVLAN=88	For untagged VLAN

Table 3 – DHCP Configuration Summary

4. Configuring the Avaya S8500 Media Server and Avaya G650 Media Gateway

Refer to reference [1] for detailed configurations of the Avaya S8500 Media Server and G650 Media Gateway. The following sections only show the QoS related configuration.

4.1. Configuring the Avaya S8500 Media Server

The Avaya IP telephones, Avaya IP Softphones, C-LAN and MEDPRO can be configured to a network region. In the sample configuration, all these components are configured to network region 1. Avaya IP telephones and Softphones can be assigned to a network region based on their source IP addresses.

Use the command **change ip-network-map** to configure the Avaya IP telephones and Softphones to network region 1. Configure the VLAN ID to match the switch configuration.

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```
change ip-network-map                                          Page   1 of  32
                         IP ADDRESS MAPPING

                                                                  Emergency
                                      Subnet                      Location
 From IP Address  (To IP Address    or Mask)  Region    VLAN     Extension

 192.168.88 .0    192.168.88 .255     24       1        88
 192.168.89 .0    192.168.89 .255     24       1        89
```

Use the command **change ip-interface** to configure the C-LAN and the MEDPRO of the Avaya G650 Media Gateway. The following two screens display the configurations of the C-LAN (01A02) and the MEDPRO (01A03). Note that the C-LAN and MEDPRO are assigned to Network Region 1 without VLAN tagging.

```
change ip-interface 01A02                                      Page   1 of   1
                                  IP INTERFACES


                 Type: C-LAN
                 Slot: 01A02
          Code/Suffix: TN799  D
            Node Name: CLAN
           IP Address: 192.168.88 .22
          Subnet Mask: 255.255.255.0
      Gateway Address: 192.168.88 .1
  Enable Ethernet Port? y
        Network Region: 1
                 VLAN: n

Number of CLAN Sockets Before Warning: 400

                               ETHERNET OPTIONS
                 Auto? y
```

```
change ip-interface 01A03                                      Page   1 of   1
                                  IP INTERFACES


                 Type: MEDPRO
                 Slot: 01A03
          Code/Suffix: TN2302
            Node Name: MEDPRO
           IP Address: 192.168.88 .21
          Subnet Mask: 255.255.255.0
      Gateway Address: 192.168.88 .1
  Enable Ethernet Port? y
        Network Region: 1
                 VLAN: n

                               ETHERNET OPTIONS
                 Auto? y
```


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Use the command **change ip-network-region** to configure the QoS and other parameters for a network region. It is recommended to enable IP direct for intra-region and inter-region connections. RSVP is not used and is disabled by default. The Avaya components including C-LAN, MEDPRO, IP telephones, and Softphones will receive QoS (802.1p priority 7 and DiffServ 56) and other parameters from network region 1 in the sample configuration. By configuring IP Codec set 1 to Network Region 1, all intra-region calls in Network Region 1 will use IP Codec set 1.

```
change ip-network-region 1                                    Page   1 of  19
                              IP NETWORK REGION
  Region: 1
Location: 1               Home Domain:
    Name: Location A
                               Intra-region IP-IP Direct Audio: yes
AUDIO PARAMETERS               Inter-region IP-IP Direct Audio: yes
   Codec Set: 1                          IP Audio Hairpinning? y
UDP Port Min: 2048
UDP Port Max: 65534                    RTCP Reporting Enabled? y
                             RTCP MONITOR SERVER PARAMETERS
DIFFSERV/TOS PARAMETERS        Use Default Server Parameters? y
 Call Control PHB Value: 56
        Audio PHB Value: 56
802.1P/Q PARAMETERS
 Call Control 802.1p Priority: 7
        Audio 802.1p Priority: 7      AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS                                    RSVP Enabled? n
  H.323 Link Bounce Recovery? y
 Idle Traffic Interval (sec): 20
   Keep-Alive Interval (sec): 5
            Keep-Alive Count: 5
```

Since **Figure 1** is a LAN infrastructure, IP Codec 1 is configured to G.711MU for high voice quality and is used for the calls in network region 1.

```
change ip-codec-set 1                                         Page   1 of   2

                         IP Codec Set

    Codec Set: 1

    Audio        Silence      Frames   Packet
    Codec        Suppression  Per Pkt  Size(ms)
 1: G.711MU           n         2        20
 2:
 3:
 4:
 5:
 6:
 7:
     Media Encryption
 1: none
 2:
 3:
```


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Use the command **change ipserver-interface** to configure the communication to the IPSI. The following screen shows that DiffServ 56 is configured for the communication from the Avaya S8500 Media Server to the IPSI of the Avaya G650 Media Gateway.

```
change ipserver-interface 1                                    Page   1 of   1
          IP SERVER INTERFACE (IPSI) ADMINISTRATION - PORT NETWORK 1

                                IP Control? y           Socket Encryption? y
 Ignore Connectivity in Server Arbitration? n                 Enable QoS? y


 Primary IPSI                                          QoS Parameters
 ------------                                          --------------
  Location:  1A01                                      Call Control 802.1p: 7
      Host: 192.168.87.19                             Call Control DiffServ: 56
   DHCP ID: ipsi-A01a
```

4.2. Configuring IPSI on the Avaya G650 Media Gateway

To configure the IPSI board, connect the computer (configured with IP address 192.11.13.5 with netmask 255.255.255.252) to the services port of the IPSI. Telnet to 192.11.13.6 and supply appropriate login credentials. The following screenshot illustrates the appropriate commands. The IPSI IP address is configured to 192.168.87.19 with default gateway 192.168.87.1. Note that VLAN tagging is disabled and DiffServ value is configured to 56.

```
TN2312 IPSI IP Admin Utility
Copyright Avaya Inc, 2000, 2001, All Rights Reserved
[IPSI]: ipsilogin
Login: craft
Password:
[IPADMIN]: set control interface 192.168.87.19 255.255.255.0
WARNING!! The control network interface will change upon exiting IPADMIN
[IPADMIN]: set control gateway 192.168.87.1
WARNING!! The control network interface will change upon exiting IPADMIN
[IPADMIN]: set vlan tag off
[IPADMIN]: set diffserv 56
[IPADMIN]: show control interface

Control Network IP Address = 192.168.87.19
Control Network Subnetmask = 255.255.255.0
Control Network Default Gateway = 192.168.87.1
IPSI is not configured for DHCP IP address administration

[IPADMIN]: show qos

QoS values currently in use:
    VLAN tagging       :      off
    VLAN id            :      0
    VLAN user priority :      6
    Diffserv value     :      56
```


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5. Configuring Extreme Networks Aspen

5.1.1. Configuring VLAN and Port

The following commands configure a VLAN "VLAN 87" corresponding to the 192.168.87.0 network, which is used for the Avaya S8500 Media Server, and IPSI of the Avaya 650 Media Gateway. Note that the ports connecting to these Avaya components are all untagged.

```
create vlan "vlan87"
configure vlan "vlan87" tag 87
configure vlan "vlan87" add port 3:1-2 untagged #S8500 Server and IPSI
```

The following commands configure a VLAN "VLAN88" corresponding to the 192.168.88.0 network, which is for C-LAN, MEDPRO of the Avaya 650 Media Server and the IP telephones. This VLAN is configured as an untagged VLAN on the ports for C-LAN and MEDPRO and as a tagged VLAN on all ports that may connect to IP telephones (in this case, ports 2:1 to 2:48 of the G48P PoE module).

```
create vlan "vlan88"
configure vlan "vlan88" tag 88
configure vlan "vlan88" add port 3:3-4 untagged #C-LAN and MEDPRO
configure vlan "vlan88" add port 2:1-48 tagged
```

The following commands establish a VLAN "VLAN89" corresponding to the 192.168.89.0 network, which is used for computers and workstations, including PCs running the Avaya IP Softphone application. The "VLAN89" is configured as an untagged VLAN on all ports that may connect to computers or workstations. Note that these are the same physical ports as the IP telephones, since a computer may optionally be attached directly to an Avaya IP telephone.

```
create vlan "vlan89"
configure vlan "vlan89" tag 89
configure vlan "vlan89" add port 2:1-48 untagged
```

The uplink 1000-Base-X port 4:1 is configured as untagged for VLAN 1 (Default VLAN) and tagged for VLAN 88 and 89. The same configuration would apply to a 100 Base-T uplink if a 100 Base-T link were used.

```
config vlan "Default" add port 4:1
onfigure vlan "vlan88" add port 4:1 tagged
configure vlan "vlan89" add port 4:1 tagged
```


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The following commands configure VLAN87, VLAN88, and VLAN89 with their IP addresses. Since the Extreme Networks Aspen disables IP forwarding for all the configured VLANs by default, IP forwarding must be enabled on the VLANs that require IP forwarding. Since VLAN87 is only used for the communication between the S8500 Media Server and the IPSI, IP forwarding does not have to be enabled on this VLAN.

```
#Enable IP forwarding
enable ipforwarding vlan "vlan87"
enable ipforwarding vlan "vlan88"
enable ipforwarding vlan "vlan89"

# Configure IP addresses
configure vlan "vlan87" ipaddress 192.168.87.1 255.255.255.0
configure vlan "vlan88" ipaddress 192.168.88.1 255.255.255.0
configure vlan "vlan89" ipaddress 192.168.89.1 255.255.255.0
```

5.1.2. Configuring QoS

The following commands establish the QoS configuration. DiffServ examination is used to classify traffic on all ports. Both Dot1p and DiffServ replacement are enabled on all the ports.

```
enable diffserv examination ports all
enable dot1p replacement ports all
enable diffserv replacement ports all
```

5.1.3. Configuring BOOTP (DHCP) Relay

A DHCP server was physically connected to the Extreme Networks Aspen in the main office. The same server was also used as a TFTP server. The IP address of this DHCP / TFTP server is 192.168.89.5. Use the following command to enable and configure the DHCP Relay.

```
enable bootprelay
configure bootprelay add 192.168.89.5
```

6. Configuring Avaya C364T-PWR Converged Stackable Switch

6.1.1. Configuring VLAN and Port

In the sample configuration, the C364T-PWR Converged Stackable Switch is configured as a Layer 2 Switch with VLANs 88 and 89.

Create VLANs 88 and 89. Configure VLAN 89 as a native VLAN and VLAN 88 as a static-VLAN on all the ports. The C364T-PWR Converged Stackable Switch will match incoming clear traffic to VLAN 89, and accept tagged traffic on VLAN 88. In the sample configuration, the IP telephones are configured on VLAN 88.

```
C360-1(super)# set vlan 89 name data-vlan
C360-1(super)# set vlan 88 name voice-vlan
C360-1(super)# set port vlan 89 1/1-48
C360-1(super)# set port static-vlan 1/1-48 88
```


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The uplink 1000 Base-X port 1/51 is configured with dot1q with vlan-binding-mode to the configured VLANs. The native VLAN is configured to VLAN 1. The same configuration applies to a 100 Base-T uplink if a 100 Base-T link is used.

```
C360-1(super)# set port vlan 1 1/51
C360-1(super)# set trunk 1/51 dot1q
C360-1(super)# set port vlan-binding-mode 1/51 bind-to-configured
```

6.1.2. Configuring QoS

The Avaya C364T-PWR Converged Stackable Switch supports four hardware queues. The 802.1p/Q or CoS to queue assignment is as follows:

	Q1	Q2	Q3	Q4
CoS	0,1	2,3	4,5	6,7

In the sample configuration, the Avaya C364T-PWR Converged Stackable Switch is used as a Layer 2 Switch. The Avaya C364T-PWR Converged Stackable Switch will prioritize VoIP traffic for the Avaya IP telephones based on 802.1p/Q priority. In the sample configuration, the 802.1p/Q priority value 7 from the IP telephones will be mapped to the highest queue. The Avaya C364T-PWR Converged Stackable Switch supports weighted round robin or strict priority queuing scheme. The strict priority queuing scheme is used in the sample configuration.

```
C360-1(super)# set queuing scheme strict
```

If the Avaya C364T-PWR Converged Stackable Switch needs to be configured as a Layer 3 router, QoS must be enabled for Layer 3. The C364T-PWR Converged Stackable Switch can be configured to trust 802.1p/Q priority (CoS) or DSCP or both for Layer 3 traffic. The following shows show to configure the C364T-PWR Converged Stackable Switch to trust CoS and DSCP, and then apply it. Layer 3 routing is not used in these Application Notes.

```
C360-1# session router
Router-1 (super)# ip access-list 101 1 permit ip any any
Router-1 (super)# ip access-list-dscp trust 101 trust-cos-dscp
Router-1(super)# ip access-group 101
```

DSCP to CoS mapping are configurable for an access list. The default mapping is shown in **Table 4**. The DSCP value 56 will be mapped to fwd7, which corresponds to the highest priority queue.

DSCP	Action	Precedence	Name
0 – 7	fwd0	mandatory	DSCP#0 – DSCP#7
8 – 15	fwd1	mandatory	DSCP#8 – DSCP#15
16- 23	fwd2	mandatory	DSCP#16 – DSCP#23
24 – 31	fwd3	mandatory	DSCP#24 – DSCP#31
32 – 39	fwd4	mandatory	DSCP#32 – DSCP#39
40 – 47	fwd5	mandatory	DSCP#40 – DSCP#47
48 – 55	fwd6	mandatory	DSCP#48 – DSCP#55
56 – 63	**fwd7**	**mandatory**	**DSCP#56 – DSCP#63**

Table 4 – Avaya C364T-PWR Converged Stackable Switch Default DSCP-CoS Mapping

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7. Interoperability Compliance Testing

This Interoperability Compliance Test included QoS testing between the Extreme Networks Aspen 8810, the Avaya S8500 Media Server, the Avaya G650 Media Gateway, and the Avaya 4600 Series IP telephones. Basic feature functionality was performed as part of the compliance testing.

7.1. General Test Approach

Connectivity and QoS test cases were performed manually. During QoS testing, an Ixia data generator was used to generate low priority traffic. When the 100 Base-T or Gigabit Fiber link was overloaded, VoIP calls with high quality can still be made between the main and branch offices.

7.2. Test Results

All the related test cases passed successfully. No errors were detected. QoS features based on 802.1p/Q priority and DiffServ on the Extreme Networks Aspen 8810 worked well with the Avaya C364T-PWR Converged Stackable Switch, Avaya S8500 Media Server, Avaya G650 Media Gateway, and Avaya IP telephones.

8. Verification Steps

The following are verification steps for these Applications Notes:

- Verify that the IP telephones and Softphones register with the C-LAN of the Avaya G650 Media Gateway. Use mute “767#” (“QoS”#) on the Avaya IP telephones to verify the QoS configuration.
- Verify that an IP telephone and the PC attached to the telephone are on different VLANs.
- Verify that the calls use G.711 Codec (use the command **status station <extension>** to verify which Codec is used on the Avaya S8500 Media Server for an active call).
- While generating data traffic between the main office and the branch office to overload the 100 Base-T or Gigabit Fiber link, make a call between the main office and the branch office. Verify that voice quality is acceptable.

9. Support

Customers should call Extreme Networks Worldwide TAC when having problems related to Extreme Networks switches. Technical support is also available at the Extreme Networks web site at http://www.extremenetworks.com/services/wwtac/.
Product documentation for Extreme Networks can be downloaded via web at http://www.extremenetworks.com/services/documentation/.

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10. Conclusion

Extreme Networks Aspen 8810 Switch was compliance-tested with the Avaya S8500 Media Server, Avaya G650 Media Gateway, Avaya C364T-PWR Converged Stackable Switch and Avaya IP telephones. All feature functionality and QoS test cases completed successfully.

11. Additional References

Application Notes:

[1] Application Notes for Extreme Networks Switches Using Gigabit Ethernet Modules with Avaya S8700 Media Servers and Avaya G600 Media Gateways Controlling Avaya G700 Media Gateways

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Appendix A – Default 802.1p to QP mapping on the Extreme Networks Aspen

```
Aspen.3 # show dot1p
   802.1p Priority Value     QOS Profile
            0                QP1
            1                QP1
            2                QP1
            3                QP1
            4                QP1
            5                QP1
            6                QP1
            7                QP8
```

Appendix B – Default DiffServ to QP mapping on the Extreme Networks Aspen

```
Aspen.4 # show diffserv examination
CodePoint->QOSProfile mapping:
        00->QP1 01->QP1 02->QP1 03->QP1 04->QP1 05->QP1 06->QP1 07->QP1
        08->QP1 09->QP1 10->QP1 11->QP1 12->QP1 13->QP1 14->QP1 15->QP1
        16->QP1 17->QP1 18->QP1 19->QP1 20->QP1 21->QP1 22->QP1 23->QP1
        24->QP1 25->QP1 26->QP1 27->QP1 28->QP1 29->QP1 30->QP1 31->QP1
        32->QP1 33->QP1 34->QP1 35->QP1 36->QP1 37->QP1 38->QP1 39->QP1
        40->QP1 41->QP1 42->QP1 43->QP1 44->QP1 45->QP1 46->QP1 47->QP1
        48->QP1 49->QP1 50->QP1 51->QP1 52->QP1 53->QP1 54->QP1 55->QP1
        56->QP8 57->QP8 58->QP8 59->QP8 60->QP8 61->QP8 62->QP8 63->QP8
```

Appendix C – Default DiffServ replacement mapping (QP → DiffServ) on the Extreme Networks Aspen

```
Aspen.5 # show diffserv replacement
QOSProfile->CodePoint mapping:
        QP1->00
        QP8->56
```


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